NuTECH Enterprises, Inc.

CORRECTIVE ACTION PLAN
For
SOILS REMEDIATION & GROUNDWATER RESTORATION
FORMER P&M SERVICE STATION
4954 York Boulevard, Highland Park, CA

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Prepared for:
CORSAIR, L.L.C.
Owners of the Former P&M Service Station #0940
9171 Wilshire Boulevard, Suite 429
Beverly Hills, CA 90211

Submitted To:

LOS ANGELES REGIONAL WATER QUALITY CONTROL BOARD
CASE File No. 100.315

February 17, 1998

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TABLE OF CONTENTS

I. EXECUTIVE SUMMARY 1

II. INTRODUCTION & BACKGROUND 3
    2.1 Site Location and Description
    2.2 Physiographic Conditions
    2.3 Geology
    2.4 Hydrogeology

III. PREVIOUS INVESTIGATIONS AND REMEDIATION WORK 6
    3.1 Site History
    3.2 1982 SHELL OIL Company Remediation Work
    3.3 1985 Events
    3.4 1992 Site Investigation
    3.5 1996 Site Investigation
    3.6 1997 Groundwater Sampling

IV. PROPOSED SITE REMEDIATION 17
    4.1 Objectives
    4.2 Treatment Criteria & MCL's
    4.3 Groundwater Investigations & Characterization
    4.4 Site Survey
    4.5 Underground Storage Tank & Source Removal
    4.6 HC Contaminated Soil Excavation and Removal
    4.7 GW Monitoring Well Installation & Site Closure Strategy

V. PROJECT TEAM & SCHEDULE 30

VI. REFERENCES 32

VII. SUBMITTAL STATEMENT 34

LIST OF FIGURES

Figure 1 – Site Location Map
Figure 2 – Site Map – Winter 1997
Figure 3 – Surrounding Uses and Development
Figure 4 – USGS Topographic Map Excerpt
Figure 5 – Geologic Structures in the Highland Park Area
Figure 6 – CDWR 1961 Basin Map Excerpt
Figure 7 – Map Excerpt Principal Geologic Formations of LA Basin
Figure 8 – 1981 Shell Field Map of Remediation Bores & Treatment System
Figure 9 – 1992 Weidner Bores and Site Condition Notes
Figure 10 –1996 Soil Pacific Site Condition Notes
Figure 11 – Weidner 1992 GW Gradient
Figure 12 – Soil Pacific 1996 GW Gradient
Figure 13 – NuTECH 1997 GW Gradient
Figure 14 – Generalized Excavation Plan
Figure 15 – Proposed GW Monitoring Well Locations
Figure 16 - Proposed GW Monitoring Well Construction (Typical)
Figure 17 – Route to Nearest Hospital

TABLES

Table One – 1992 Weidner Soils Bore Analytical Data
Table Two – 1992 Weidner Existing Well Observations
Table Three – 1996 Soil Pacific Groundwater Analysis Data
Table Four – 1997 NuTECH GW Field Data
Table Five – Historical Groundwater Elevations 1992, 1996 & 1997
Table Six – 1997 NuTECH Groundwater Lab Data
Table Seven – Typical Aromatic % Composition of Gasoline & Diesel
Table Eight – Comparison of GW Lab Data 1996 & 1997
Table Nine – Proposed Maximum Cleanup Levels Groundwater
Table Ten – Fuel Components of Health Concern
Table Eleven – Project Team
Table Twelve – Project Schedule

APPENDICES:

Appendix A – 1997 Site Photos
Appendix B – Weidner 1992 Bore Logs
Appendix C – NuTECH 1997 Field Data
Appendix D – Detailed Licensed Site Survey and Well Elevations
Appendix E – NuTECH 1997 Lab Data, QA/QC Data and Chain of Custody
Appendix F – MSDS's and Safety Reporting Forms

I. EXECUTIVE SUMMARY

The purpose of this Corrective Action Workplan (CAP) is to provide resolution to the documented fuel contamination of soils and groundwater at the former TARGET Service Station No. 0940. The site is located at 4954 York Boulevard, in the Highland Park area of the City of Los Angeles, Los Angeles County, California. Under a Special Agreement with the US Bankruptcy Court, the current owner – CORSAIR L.L.C., and the California EPA the Lead Agency for review of this proposed remediation and site restoration effort is the Los Angeles Regional Water Quality Control Board --- Site Cleanup Unit, Jim Ross, Unit Chief.

The facilities at the site consist of an older service station building with two pump islands, a waste oil tank, and a cluster of four underground storage tanks southeast of the one story building. The site is at an elevation of about 560 feet above Mean Sea Level (MSL) in the generally flat central portion of a small valley located between the San Rafael Hills to the north and the Repetto Hills to the south. Previous investigators of the site (Weidner, 1992; Soil Pacific, 1996) have suggested that the site is underlain by a shallow semiconfined to confined aquifer, and a semiconfined secondary fractured bedrock aquifer. The groundwater gradient and flow directions have shown significant variability. Water level data from 1992 and 1996 indicated a generally eastward flow, but 1997 measurements appear to indicate a more complicated flow pattern in a predominantly south to southwest direction.

Environmental problems at the site consist of contaminated soil and groundwater resulting from operational spills originating in the petroleum UST areas, as well as piping and dispenser area failures over the years. The site was originally constructed in 1965 as a Retail Fuel Service Station by Shell Oil Company. The facility remains as original, with no improvements or upgrades for 1998 UST standards. While the history of the site is incomplete, there were at least three major releases of a "Reportable Quantity" which have been documented and addressed. These include:

- ✓ On May 1,1981 a report of a strong gasoline odor from the S/W corner stormdrain of 50th Avenue and York was phoned in to the LA Fire Department. Within days, Shell Oil Company abated the source and, throughout 1982, utilized a dual pump extraction system to remove free floating gasoline product from the dispenser area at the northeast corner of the Lot, along 50th Avenue. Correspondence from Shell to the California Regional Water Quality Control Board (Shell, 1982) indicated that a total of 610 gallons of gasoline had been recovered from an estimated release of approximately 800 gallons resulting from a broken fuel line.

- ✓ On March 1, 1985 Shell contacted the Chapman and Clark families (the assumed owners of the facility --- dba Target #0940) and notified them that, out of courtesy to the LARWQCB, Shell had gauged the on-site observation wells which "indicate the presence of free floating gasoline". Shell went on to state that a chemical fingerprint indicated that the fuel was not Shell product and that Target should immediately correct the release.

- ✓ On May 4 of 1992 the current owners/operators of the facility known as P&M Service Station #940, reported a release of an unknown quantity of diesel fuel product from a piping failure, which was reported as "repaired and replaced". This repair effort was verified by a May 20, 1992 Raetec Engineering pressure test of the repaired line submitted to LARWQCB.

As a result of these reported releases some limited remediation and investigation efforts were completed. In addition to the Shell 1981-83 remediation of free floating gasoline, Randall S. Weidner & Associates was retained in early 1992 to complete a *Preliminary Site Assessment.* Noting the existence of six shallow cased and screened possible vapor wells (designated A through F) on March 28-30, 1992, Weidner drilled twelve solid-stem auger boreholes to depths of 12-21 feet below surface in the underground storage tank areas and near the dispenser islands. Analytical results indicated the presence of "free floating" fuel product, as well as elevated solubilized concentrations of gasoline and diesel hydrocarbons in all boreholes. Oil was indicated in the bore hole closest to the used oil tank.

In December of 1996, Soil Pacific, Inc. was retained to complete a Limited Groundwater Evaluation of the site for the current owner – CORSAIR L.L.C. The results of their investigation which utilized the A though F vapor wells, as well as a newly installed well (completed by unknown parties between 1992 and 1996) confirmed the 1992 findings of some free product and some solubilized gasoline and diesel.

As discussed in this Corrective Action Workplan, NuTECH has also completed some work on-site prior to the writing of this plan. This work included an additional limited groundwater evaluation, a well and site survey, and an inspection of the existing UST's and Dispensers. Based on a review of the available reports, as well as refinement of available data with 1997 chemical testing of groundwater, we are submitting this Corrective Action Workplan to:

- ✓ Eliminate existing contamination sources (tanks, piping and dispensers)as well as conduits (improperly cased wells and treatment vaults);
- ✓ Aggressively remove hydrocarbon contaminated saturated soils; and
- ✓ Aggressively de-water contaminated shallow groundwater resources.

Once the first phase of the remediation is completed, the site will be upgraded with double walled tanks, product lines and dispensers to construct a regulatory compliant retail fuel station. Then we will then install groundwater monitoring wells for monitoring and verification of passive remediation of the residual fuel constituents consistent with LARWQCB and State Water Resources Control Board Guidelines. Once data verify source removal and passive remediation of residual contaminant is progressing, NuTECH will file with LARWQCB for Site Closure as a No Further Action designated site.

II. INTRODUCTION AND BACKGROUND

2.1 Site Location and Description

The site is located at 4954 York Boulevard, in the Highland Park area of the City of Los Angeles, Los Angeles County, California. The property is on the southwest corner of York Boulevard and Avenue 50, in the central portion of Highland Park. (See Figure 1)

The facilities at the site consist of a one-story 1,540 square foot service station building with two auto service bays, two bathrooms and an office. (See Figure 2 and site photos Appendix A). Behind the building adjacent to the rear of the service bays is an underground storage tank "UST" of unknown volume utilized for used oil storage. Two canopy covered dispenser islands are located along York Boulevard and Avenue 50, on the northern and eastern sides of the site. A cluster of underground tanks is located east of the service building, in the southeast part of the site. The cluster consists of four underground storage tanks: Two 8,000 gallon tanks which contained gasoline; and Two 5,000 gallon tanks, one of which contained premium-grade gasoline and the second of which contained diesel (Weidner, 1992).

Development around the site includes residential, commercial and industrial uses. (See Figure 3)

2.2 Physiographic Conditions

The site is at an elevation of about 553 feet above Mean Sea Level (MSL) in the generally flat central portion of a small valley located between the San Rafael Hills to the north and the Repetto Hills to the south (USGS, 1966) (See Figure 4 for Topo Map Excerpt). The summit of Mt. Washington, located about one mile southwest of the site, is at an elevation of approximately 850 feet MSL. North of the site, elevations from 700 to 850 feet MSL are found in the San Rafael Hills.

The paved area of the station slopes away from the building, toward street gutters which drain southward on Avenue 50 and westward on York Boulevard. The surface slope along York Boulevard in the area of the site is about 40 feet per mile toward the west (USGS, 1966). At its intersection with Eagle Rock Boulevard, about one mile west of the site, York Boulevard is at about 500 feet MSL. The opposite end of York Boulevard, where it intersects Figueroa Boulevard about one mile east of the site, is at an elevation of about 600 feet MSL.

The site is about 2.5 miles north of the Los Angeles River, and about 1.5 miles northwest of Arroyo Seco (Figure 4).

2.3 Geology

The site is located at the northeastern edge of the Los Angeles Basin, near the intersection of the east-west trending Santa Monica Fault System and the northwest-southeast trending Whittier Fault System (Lamar, 1970). Several major faults and a number of smaller faults cross the area. East of Arroyo Seco, a few miles east of the site, the Raymond Hill Fault in the Pasadena area is marked by a distinct topographic break and a difference in groundwater levels on either side of the fault (Eckis, 1934).

The York Boulevard fault is exposed in the hills west of Eagle Rock Boulevard and west of Figueroa Street. The central portion of the fault is covered by alluvial deposits, beneath which it is inferred to run parallel to York Boulevard (Figure 5). Vertical separation along the York Boulevard fault has been suggested to be at least 10,000 feet (Lamar, 1970). The Highland Park Fault is truncated at its northwestern end by the York Boulevard Fault (Figure 5). The York Boulevard Fault is shown as a potentially active fault (as part of the "Raymond Hill Fault") on the Special Studies Zone map of the Los Angeles Quadrangle (CDMG, 1977).

Numerous folds are present in the area, probably formed by movement along the area's faults. Most of the fold axes strike between west-northwest and east (Lamar, 1970). Intense folding of the Topanga Formation rocks in the San Rafael Hills may be the result of drag along the western continuation of the Raymond Hill Fault (Lamar, 1970).

The York Boulevard Fault forms a boundary between two different types of bedrock (Lamar, 1970). North of the fault, (See Figures 6 and 7) the Topanga Formation consists of sandstones and conglomerates. South of the fault, the Topanga Formation is characterized by distinctly bedded siltstones. A geologic Cross-section by Lamar (1970) shows the steeply dipping Fernando Formation and Topanga Formation conglomerates in fault contact beneath about 100 feet of undifferentiated alluvial and terrace deposits.

The Upper Pleistocene Terrace deposits and the younger alluvium of the valley floor cover the bedrock to a depth of about 100 feet. Both units consist of silt, sand and gravel (Lamar, 1970). The Pliocene Fernando Formation is a predominantly sandstone and conglomerate unit which crops out south of York Boulevard (Lamar, 1970)

2.4 Hydrogeology

Previous investigators of the property (Weidner, 1992; Soil Pacific, 1996) have suggested that the site is underlain by a shallow semiconfined to confined aquifer, and a semiconfined secondary fractured bedrock aquifer. The site is somewhat isolated by surrounding bedrock from the much larger groundwater basins to the north and south of the area (CDWR, 1975).

The area around the site is in part of the Los Angeles River Watershed, located between Arroyo Seco and the Los Angeles River. The site is in the Los Angeles-San Gabriel Hydrologic Unit, within the area of the Bull Canyon and Eagle Rock hydrologic subareas of the San Fernando Hydrologic Area (RWQCB, 1995). The site is about 4 miles northeast of the Los Angeles River narrows, where the unlined portion of the river channel is characterized by existing high levels of chemical contamination of VOCs and nitrates (RWQCB, 1995).

The site is in the extreme southeast portion of the San Fernando Valley Groundwater Basin (No. 4-12), but is outside of the deep alluvial portion of the Basin, which has widespread pollution problems (RWQCB, 1995). The site is in the relatively small Eagle Rock Groundwater Basin, which has the following existing beneficial uses: Municipal and Domestic Supply, Industrial Services Supply, Industrial Process Supply, and Agricultural Supply.

According to published maps (CDWR, 1961), the area around the site is dominated by non-water-bearing rocks, precluding the presence of significant aquifers in the thin veneer of Pleistocene alluvial deposits. Small quantities of groundwater from local perched aquifers would be of relatively little value in the urbanized area around the site.

Weidner (1992) noted the presence of Los Angeles County Well No. 3987H, located about 2,000 feet west of the site, where groundwater was measured at a depth of 3 feet below ground surface (BGS) in 1992. If this information is correct, it may indicate the presence of a confined water-bearing zone, similar to that proposed for the Target Service Station site. However, due to the complex geology of the area, this well might be installed in a very different geologic setting from that of the service station.

On-site borings by Weidner (1992) encountered groundwater at about 20 feet BGS, but subsequently installed groundwater monitoring wells indicate levels of 3-7 feet BGS. This strongly supports the possibility that there is a confined aquifer beneath the site. The logs of the 12 Weidner borings (Appendix B) indicate the presence of SC (silty sand) and CL (clay) soils, using the Uniform Soil Classification System Terminology. Such fine grained soils could form the confining layers for a shallow water-bearing zone.

III. PREVIOUS INVESTIGATIONS AND REMEDIATION WORK

3.1 Site History

Because of the lack of easily available information on the development and use of the Property, we have constructed a site history which indicates the time for various uses only generally. Most of our information is from a 50 Year Title Search of Owners and the Los Angeles Department of Building and Planning for building permits. In addition we utilized the limited information available in the Los Angeles County Fire and Public Works files for reportable events and permits.

The service station property consists of Lots 13, 14 and 15 in Block "G" of the Highland Park Electric Tract, City of Los Angeles, recorded in Book 9, Page 162 of Maps, in the office of the Los Angeles County Recorder. Between January, 1963 and April, 1965, the ownership of all three lots was obtained by the Chapman and Clark families. In 1965, Shell Oil Company obtained permits to construct a retail gas station on the property (DBS, 1965).

In June, 1981, the Chapman and Clark families transferred the property to the Kneiding family. The property was then transfered by the Kneidings to the Oh family on August, 1983. Less than a year later, on February 13, 1984, the title for the three lots was transferred to Gary and Rebecca Lazar, owners of a number of Target Service Stations.

On March 13, 1996, the United States Bankruptcy Court, Central District of California, issued an order granting the Trustee's request to authorize sale of the 4954 York Boulevard property to CORSAIR, LLC, a Nevada Limited Liability Company with offices at 9171 Wilshire Boulevard, Suite 429, Beverly Hills, CA 90211. CORSAIR is the current owner of the Property.

The operational and use history is less clear than the property ownership. The service station was operated as a Shell Oil facility from at least 1965 through possibly February of 1984 when the Lazar's bought the Property and were evidently operating it as a Target Station in March of 1985 (Shell Letter to Chapman and Clark). It is unclear when the Station was converted to a P&M Station but in the May, 1992 Diesel Spill Release Notice to LA City Fire the station is listed as such.

A review of available regulatory Agency files shows there were at least three major releases of a "Reportable Quantity" which have been documented and addressed. These include:

- ✓ ***On May 1,1981*** a report of a strong gasoline odor from the S/W corner stormdrain of 50th Avenue and York was phoned in to the LA Fire Department. Within days Shell Oil Company abated the source and throughout 1982 utilized a dual pump extraction system to remove free floating gasoline product from the dispenser area at the northeast corner of the Lot along 50th Avenue. Correspondence from Shell to the California Regional Water Quality Control Board (Shell, 1982) indicated that a total of 610 gallons of gasoline had been recovered from an estimated release of approximately 800 gallons resulting from a broken fuel line.

- ✓ ***On March 1, 1985*** Shell contacted the Chapman and Clark families (who Shell thought were still the current owners) of the facility (dba Target #0940), and notified them that out of courtesy to the LARWQCB, Shell had gauged the on-site observation wells which "indicate the presence of free floating gasoline". Shell went on to state that a chemical fingerprint indicated that the fuel was not a Shell product and that Target should immediately correct the release.
- ✓ ***On May 4 of 1992*** the current owners/operators of the facility known as P&M Service Station #940, reported a release of an unknown quantity of diesel fuel product from a piping failure, which was reported as "repaired and replaced". This repair effort was verified by a May 20, 1992 Raetec Engineering pressure test of the repaired line submitted to LARWQCB.

As a result of these reported releases, some limited remediation and investigation efforts were completed. We discuss these efforts in depth below, citing possible impacts to current conditions.

3.2 1982 Shell Oil Company Remediation Work

On May 1, 1981, the Los Angeles City Fire Department received a complaint regarding gasoline odors in the vicinity of a storm drain at the southwest corner of the intersection of 50th Avenue and York. Because of the strong fuel odors, the Los Angeles City Fire Department flushed the storm drain line and channel and notified the Los Angeles Regional Water Quality Control Board that the Shell Oil Company station on the southwest corner of the intersection was the suspected source of the odors. Shell was contacted and reported that on April 27, 1981, a leaking fuel line responsible for a spill of approximately 800 gallons of gasoline (100 gallons/day) had been successfully repaired. (Shell, 1981) However, because strong gasoline odors persisted in the storm drain catch basins around the intersection, Shell admitted that significant amounts of fuel could still be present in the site's soils, and agreed to complete a site investigation.

On May 8, 1981, Shell installed seven 4-inch diameter observation wells on the eastern side of the property in the area of the broken line (See Figure 8). While there is no formal written report of this well installation effort, LARWQCB file notes indicate that during drilling, faint to moderate gasoline odors were noted at 8-10 feet below grade. Sampling of the wells a few days later (May 11, 1981) indicated the presence of 1.25 inches of a jet black gasoline in well No. 2, located near the dispenser island on the east side of the station. Well No. 4, located southeast of the same dispenser island, contained 4 inches of the black gasoline product. Because of the dark color of the gasoline, Shell considered it to be evidence that the fuel was the result of an old spill. At the time of the drilling and sampling of the wells, an inspector from the Los Angeles County Department of Public Works reported moderate to strong gasoline odors from the off-site storm drain catch basins, but remarked that his inspection of the discharge from the 50th Avenue storm drain revealed no gasoline.

On May 21, 1981, Shell commenced remediation of the contamination caused by the 800 gallon release of the previous month. Removal of the subsurface gasoline was to be accomplished by means of a vacuum truck pumping from two 30-inch diameter wells drilled to 25 feet below grade. During drilling of these wells, significant amounts of gasoline were encountered (7 inches in Well No. 2 and 18 inches in Well No. 4). On June 12, 1981, vacuum truck pumping was halted because of poor production. Only about 75 gallons of fuel had been removed (Shell, 1981).

On July 14, 1981, Shell installed a "fairly elaborate two pump underground recovery system" consisting of a sump pump, an oil/water separator, a gasoline storage sump, and an electronic discriminating pump system (Shell, 1981). (Again see Figure 8 for location of wells and equipment). By mid-September, 1981, this system had recovered approximately 100 gallons of product and had pulled product away from the storm drain system, according to Shell, who remarked that the system was pulling slower than expected.

By October 22, 1982, Shell reported that 610 gallons of the original 800 gallon gasoline release had been recovered, mostly by the two-pump system (Shell, 1982). Shell was convinced that the underground pump system had reached the limit of its effectiveness and that hand-bailing of the remaining gasoline from the wells would be an appropriate method for completion of the remediation (Shell, 1982). Shell removed the two-pump system and, on May 13, 1983, informed the Los Angeles Region Water Quality Control Board that the cleanup was complete (Shell, 1983).

3.3 1985 Events

On March 1, 1985, Shell contacted the current owners of the site, now operated as Target Station No. 0940, regarding gasoline discovered in the on-site monitoring wells (Shell letter to Chapman and Clark, 1985). Shell stated that at the request of the LARWQCB they gauged the on-site monitoring wells and that the "chemical fingerprint" of the gasoline fuel indicated that it was not a Shell product. Thus they stated that Shell would not be responsible for remediation of the discovered contamination.

Sometime between this 1985 and the 1992 investigation effort discussed below, six wells were installed as shown on Figure 9 (Wells A-F), reportedly for a vapor extraction remediation system. While we have no other information than the observation of them present time as well as a reference to them in 1992 and 1996, we do note that they are in the area of the earlier gasoline releases and that VES is a traditional remediation approach for gasoline remediation. When Weidner arrived on-site in 1992 for a Site Investigation, these wells were non-operational.

3.4 1992 Site Investigation

On May 4, 1992, the current operators of the site, then known as P & M Station No. 940, reported a release of diesel fuel caused by a piping failure, which was repaired the same day.

In Spring, 1992, Randall Weidner, CEG was retained to complete a *Report of Preliminary Site Assessment* for the City of Los Angeles Fire Department. which was the then Lead Agency for remediation of fuel spill. The effort included the drilling and sampling of twelve new soil borings to a maximum depth of 21 feet, with chemical analysis of soil samples from each boring. Based on this new information, a report was prepared which provided a limited evaluation of geologic and hydrogeologic conditions at the site and an assessment of the impact to soil and groundwater of the product releases at the site. Weidner's investigation was not designed to evaluate the groundwater chemistry in detail.

On March 28-30, 1992, 12 solid stem auger boreholes were drilled to depths of 12-21 feet bgs in the underground storage tank area and in the vicinity of the dispenser islands (Figure 9). Boreholes B-1 through B-7 were drilled in the southeast part of the property. Borings B-8 through B-12 were drilled along the northeast and northern sides of the site. Six of the 1992 boreholes did not encounter groundwater. Field screening of the soil samples for petroleum hydrocarbons was conducted using a photoionization detector (PID). Borehole logs from the 1992 drilling program are included in this CAP as Appendix B.

Analytical data as displayed below on Table One indicated the presence of elevated concentrations of hydrocarbons and aromatic volatiles in the shallow soil samples from all boreholes. The concentration of Total Recoverable Petroleum Hydrocarbon (TRPH) measured as US EPA 418.1 in the boring adjacent to the waste oil tank (boring B-1) was highest at a depth of ten feet, at 4,600 mg/kg (ppm). The highest concentrations of diesel and gasoline measured as US EPA 8015-M were in the tank bed area, along the piping runs, and near the dispenser islands generally within soils from surface to the upper seven feet of the borehole.

With few exceptions, the 15 and 20 foot samples contained non-detect levels of fuels. The aromatic volatiles (as US EPA 8020-BTX&E) showed a pattern of distribution similar to that of the TPH for gasoline and diesel. Organic lead was not detected in any of the soil samples from the borings.

TABLE ONE
SUMMARY OF ANALYTICAL SOILS DATA
US EPA 8015- Gas & Diesel, TRPH as 418.1 and Fuel Aromatics US EPA 8020 – BTX&E
Weidner Investigation 1992

Sample No. (feet BGS)	8015 Gasoline (mg/Kg)	418.1 TRPH (mg/Kg)	8015 Diesel (mg/Kg)	8020 Benzene (ug/Kg)	8020 Toluene (ug/Kg)	8020 Xylenes (ug/Kg)	8020 Ethylbenzene (ug/Kg)
B-1-5	-	ND	-	14	ND	13	ND
B-1-10	-	4,600	-	10,000	40,000	120,000	17,000
B-1-15	-	ND	-	30	52	130	21
B-2-5	1.6	-	-	180	13	210	43
B-2-10	66	-	-	700	1,100	4,100	700
B-2-15	1.3	-	-	170	10	20	6
B-2-20	ND	-	-	20	8	20	ND
B-3-5	-	-	2,000	600	51	3,200	960
B-3-10	-	-	1,000	14	11	330	63
B-3-15	-	-	ND	4	ND	ND	270
B-3-20	-	-	ND	ND	ND	9	ND
B-4-5	2,900	-	1,000	13,000	5,700	330,000	45,000
B-4-10	ND	-	190	1,900	4,700	20,000	2,400
B-4-15	ND	-	190	210	13	460	120
B-4-20	ND	-	ND	ND	ND	6	ND
B-5-5	ND	-	-	18	ND	ND	ND
B-5-10	2.2	-	-	1,000	220	250	50
B-5-15	ND	-	-	10	ND	22	ND
B-5-20	ND	-	-	44	30	46	8
B-6-5	970	-	ND	3,200	1,800	42,000	9,100
B-6-10	1,400	-	ND	16,000	120,000	280,000	47,000
B-6-15	ND	-	ND	40	23	14	ND
B-6-20	ND	-	ND	10	7	5	ND
B-7-7	3100	-	ND	18,000	160,000	380,000	66,000
B-7-12	56	-	ND	2,400	5,900	12,000	2,000
B-8-7	ND	-	ND	610	39	340	370
B-8-12	1600	-	ND	4,600	14,000	120,000	17,000
B-9-7	150	-	-	140	1,600	15,000	1,900
B-9-12	290	-	-	3,000	7,400	19,000	2,600
B-9-15	1.0	-	-	4,700	100	100	22
B-10-7	720	-	-	1,200	8,100	48,000	7,700
B-10-12	98	-	-	2,400	4,400	5,100	900
B-10-17	0.7	-	-	460	29	28	10
B-11-7	23	-	-	190	640	4,100	850
B-11-12	86	-	-	1,600	5,200	10,000	1,700
B-12-7	710	-	-	670	1,500	4,200	610
B-12-12	1.1	-	-	41	170	350	62

(-) Not Tested
ND: Non Detect at MDL
MDL: Method Detection Limit
Gasoline: 30-0.3 mg/Kg (ppm)
Benzene: 0.3 ug/Kg (ppb)
Toluene: 0.5 ug/Kg (ppb)
Xylenes: 0.5 ug/Kg (ppb)
Ethylbenzene: 0.5 ug/Kg (ppb)

The bore logs compiled by Weidner for the twelve borings (Appendix B this Submittal) indicate that a typical clay rich alluvial soil is present from the subgrade elevation (just beneath the asphalt paving) to the explored depths. Soils types are classified using the Uniform Soils Classification System as massive to thickly layered, olive grey (0-10 ft BGS); to yellow brown clayey sands (SC) to sandy clays (CL) at 10-21 feet BGS. Groundwater was encountered in six of the twelve exploratory borings drilled on the site during this study.

Weidner (1992) also completed a limited groundwater assessment utilizing water levels and geochemical data from the six 4-inch diameter wells (A-F) previously installed at the site, reportedly for use in a vapor extraction system. As shown on Table Two below, the 1992 measurements of groundwater levels in six monitoring wells indicated depth to water of 6.8 to 8.4 feet bgs, with free product present in wells A & B located in the tank cluster area of the southern portion of the site. Well A, located southwest of the storage tanks, contained 8 inches of free product. Well B, northeast of the tank cluster, contained 14 inches of free product.

TABLE TWO
EXISTING WELL OBSERVATIONS
WEIDNER -- 1992

WELL No.	TOTAL DEPTH (ft.)	DEPTH TO GROUNDWATER (ft.)	PRODUCT THICKNESS
A	12.5	7.8	0.67
B	14.0	7.2	1.17
C	20.0	7.8	0.0
D	21.4	8.4	0.0
E	20.4	8.1	0.0
F	20.1	6.8	0.0

Based on these data, Weidner (1992) concluded that there had been a significant release of stored product from the underground tanks, resulting in the development of a free-product layer of hydrocarbons up to fourteen inches thick around the existing tank bed. Although the vertical limits of hydrocarbon contamination appeared to be limited to the upper 15 feet of soil, the lateral extent of the contaminant plume remained unclear. Subsurface contamination was found in the area of the dispenser islands, the piping runs between the two dispenser islands, and the tank cluster area, indicting a fairly widespread but shallow contamination of the eastern half of the property.

Weidner (1992) recommended the removal of the existing tanks and product transfer lines, removal of the free product, and additional investigation to define the distribution of released product in the site soil and groundwater. Because of the relatively low-permeability of the site soils, a low-flow, product-only recovery system was recommended.

3.5 1996 Site Investigation

In December, 1996, Soil Pacific, Inc., was retained by CORSAIR, L.L.C. to complete: a Limited Groundwater Evaluation based on a site reconnaissance, review of records, groundwater sampling of existing wells where possible, analytical testing and a summary report. As shown on Table Three below, Soil Pacific utilized wells A, B, E, F, and B-4 to obtain their December, 1996 data. As shown on Figure 10, Well B-4 was a newly discovered well which had not been noted in the 1992 Weidner Report.

TABLE THREE
GROUNDWATER PRODUCT SAMPLE ANALYSIS
US EPA 418.1, 8015 and 602
SOIL PACIFIC – December, 1996

Sample No.	TRPH (mg/Kg)	Oil C-20 C-40 (mg/Kg)	TVPH C-4 C-10 (mg/L)	Benzene (ug/L)	Toluene (ug/L)	Ethylbenzene (ug/L)	Total Xylenes (ug/L)	MTBE (ug/L)
#A	94,000	60,000	3,960	57,000	66,000	71,000	385,000	31,000
#A 2nd	-	60,000	3,960	57,000	66,000	71,000	385,000	31,000
#B	-	-	36	98	83	785	5,110	ND
#E	-	-	ND	ND	ND	ND	ND	ND
#F	-	-	ND	ND	ND	ND	ND	ND
B-4	-	-	10,000 ug/L	873	2	37	25	3280

(-) Not Tested
ND: Non Detect at MDL
MDL: Method Detection Limit
Gasoline - 8015 = 0.1 mg/L (ppm)
Heavy Oil - 8015 = 100 mg/Kg (sludge)
Benzene = 5 ug/L (ppb)
Toluene = 5 ug/L (ppb)
Xylenes = 10 ug/L (ppb)
Ethylbenzene = 5 ug/L (ppb)
MTBE = 25 ug/L (ppb)

The resultant data show that gasoline hydrocarbon was detected in Wells A, B, and B-4. In Well A the first and second samples are for the oil sludge discovered in this well .

As part of the Soil Pacific's conclusions and recommendations, they proposed to better delineate the plume by drilling additional Geoprobe/Hydropunch borings and installing additional groundwater monitoring wells. They also noted the need for a reliable site and well survey and the need for a proper destruction of Well A (where dumping of oil wastes was observed). Soil Pacific interpreted the available measurements of depth to groundwater (See Figure 12) as indicative of a northeast gradient, but noted that an accurate survey of well head elevations had not been made.

3.6 1997 Groundwater Sampling

On September 24, 1997, NuTECH personnel, in anticipation of preparation and submittal of the Corrective action Workplan for the new property owners, obtained groundwater samples from nine of the eleven groundwater monitoring wells (or wells which had groundwater in them) identified in previous reports as on the service station property. We obtained standing groundwater elevations, as well as discrete samples for laboratory testing. The discrete samples were obtained after purging at least two well volumes to 55 gallon DOT approved Drums. The resultant field data are included as Appendix C to this report, and are displayed below as Table Four.

TABLE FOUR
1997 FIELD DATA FOR GROUNDWATER WELLS

Well No.	Total Well Depth (ft)	Depth to Groundwater			Product Thickness		
A	12.5'	7.8	7.9		0.67	--	
B	14.0'	7.2	3	8.2	1.17	--	0
C	20.0'	7.8		6.9	0	--	0
D	21.4'	8.4		7.9	0	--	0
E	20.4'	8.1	7.9	7.8	0	--	0
F	20.1'	6.8	6.25	6.4	0	--	0
B-4	20.7'		9.3			--	

At the time of sampling, it appeared that Well A, located southwest of the storage tank cluster, had been contaminated by heavy used motor oil poured down the well casing unfortunately confirming Soil Pacific's 1996 findings. As discussed in Section IV of this CAP, we have concluded that the heavy oil may have contaminated some of the soil surrounding Well A and have therefore, scheduled it for closure and over-excavation during the UST removal effort. Also, because of the dumping of oil into the well, we did not use it in determining the gradient or limits of the on-site hydrocarbon plume(s).

In addition, as shown in Appendix D, NuTECH commissioned and obtained a detailed site survey, which included accurate elevations for a wells at the site. For the first time, it was possible to determine the water table gradient beneath the service station. In general, the water levels show little change over the 1992 to 1997 period as shown on Table Five below, which compares the corrected groundwater levels from 1992, 1996 and 1997.

TABLE FIVE
HISTORICAL GROUNDWATER ELEVATIONS

Well Number	Collar Elevation	Weidner 1992	Soil Pacific 1996	NuTECH 1997
A	553.82	546.02	545.92	-
B	553.70	546.50	550.70	545.47
C	553.87	546.07	-	546.95
D	553.80	545.40	-	545.88
E	554.06	545.96	546.16	546.27
F	553.37	546.96	547.12	546.79
B-4	553.27	-	543.97	-
N-V-1	553.54	-	-	546.04
N-V-2	553.70	-	-	545.95
N-V-3	553.47	-	-	545.70
N-V-4	553.70	-	-	543.53

Depth to water measurements taken by previous investigators (Weidner, 1992 and Soil Pacific, 1996) appear to indicate a generally southeasterly gradient. (See Figures 11 & 12) The 1996 measurement for Well B appears to be higher than would be expected, but all other wells appear to be consistent with the southeasterly flow direction.

NuTECH's 1997 water level data appear to show a more complicated flow pattern than the previous investigations (Figure 13). While a small portion of the site, near the northeast corner of the lot, appears to have an easterly to southeasterly gradient direction similar to that shown by previous data, the remainder of the site appears to have a southerly to southwesterly gradient. The distinct southwest flow indicated in the area of the fuel storage tank cluster would have significant implications for any contaminants carried off-site toward the southwest. This apparent direction of contaminant movement is nearly opposite that postulated by previous investigators (SoilPacific, 1996), who were hampered by the lack of surveyed well collar elevations. The southwest gradient indicated by the NuTECH data is more consistent with the westerly direction of surface flow than the southeast gradient suggested by previous investigations. Future groundwater monitoring efforts should include additional water level measurements in order to resolve the gradient more accurately.

The results of the chemical analysis for the nine 1997 sampled wells are displayed below as Table Six. The wells included five of the six A through F wells and four newly discovered wells NV-1-4 (New Vapor 1 through 4). Lab Data Sheets, QA/QC data and Chain of Custody Documents are included as Appendix E to this CAP.

TABLE SIX
1997 GROUNDWATER/PRODUCT SAMPLE DATA
US EPA Methods 8015 and 602
In mg/L (ppm) 10/2/97

Well No.	Depth to GW (ft)	TPH Gasoline	Benzene	Toluene	Total Xylenes	Ethylbenzene	MTBE
A	Used Oil Product						
B	8.2	75,000.00	250.00	1,100.00	5,600.00	650.00	280.00
C	6.9	9,200.00	3,600.00	44.00	51.00	58.00	22.00
D	7.9	3,100.00	960.00	20.00	53.00	5.50	ND
E	7.8	5,500.00	2,200.00	20.00	38.00	6.20	50.00
F	6.4	ND	1.10	1.80	3.30	ND	ND
NV-1	7.5	32,000.00	3,700.00	150.00	350.00	1,900.00	14,000.00
NV-2	7.4	260,000.00	22,000.00	330.00	10,000.00	3,200.00	23,000.00
NV-3	7.8	10,000,000.00	16,000.00	29,000.00	18,000.00	19,000.00	10,000.00
NV-4	10.1	40,000,000.00	400,000.00	1,600,000.00	4,000,000.00	550,000.00	ND

The resultant data indicate a general increase in solubilized product in all wells as BTX&E and gasoline. In addition, they indicate the presence of MTBE, which was not indicated in the 1996 data. Gasoline and MTBE are also indicated in WELL NV-4 (New Vapor – 4) which is located as shown on Figure 13 in the southwest corner area of the lot, southwest of the Used Oil Tank.

Well "F" located at the northeast area of the property along York Boulevard remains Non Detect for fuel constituents. We have indicated a typical fingerprint of fuel by percentage fuel aromatics below as Table Seven. A review of the typical concentrations would indicate that the contamination appears to be a "mixed bag" of aged and recent gasoline with some possible diesel in Well NV-3. The presence of MTBE in Well NV-4 would indicate (post 1976) gasoline presence in the area of the "used oil" tank well which still contains visible and free standing "oil sludges".

TABLE SEVEN
TYPICAL AROMATIC % COMPOSITION OF GASOLINE & DIESEL

	Benzene	Toluene	Xylenes	Ethylbenzene	MTBE*
Gasoline C4 – C12	3.3%	16.0%	15.0%	4.0%	1%
Diesel C7 – C24	0%	0.05%	0%	12.0%	0%

(*) Methyl-Tert-Butyl Ether CAS #1634-04-4

To assist in a review of 1996 and 1997 Well Data for fuel constituents we have compiled Table Eight below for the data where available. The data indicate no major change or "spikes" due to a new release. The presence of MTBE indicate gasoline discharge (via Well A) and/or releases throughout the site. The data seem to indicate a predominant Diesel concentration southeast of the Diesel Tank.

TABLE EIGHT
COMPARISON OF GW LAB DATA
US EPA Methods 8015 & 602
in mg/L (ppm) December, 1996 & October, 1997

Well No.	Gasoline		Benzene		Toluene		Total Xylenes		Ethylbenzene		MTBE	
A	3960	--	57		66	--	385		71	--	31	--
B	36	75	0.098	0.25	0.083	1.1	5.11	5.6	0.785	650	ND	0.28
C		9.2	--	3.6	--	0.044	--	0.051	--	0.058	--	0.022
D		3.1	--	0.96	--	0.02	--	0.053	--	0.006	--	
E	ND	5.5	ND	2.2	ND	0.02	ND	0.038	ND	0.006	ND	0.05
F	ND	ND	ND	0.001	ND	0.002	ND	0.003	ND	ND	ND	ND

IV. PROPOSED SITE REMEDIATION

When NuTECH arrived on-site in late 1997, we worked with the CLIENT to remove abandoned autos and other debris (including drums of waste) which had been left on the premises. NuTECH then fenced the yard area where the Project will take place. It should be noted again that, in addition to the wells and vapor well locations cited in 1992 and 1996, we also encountered four new additional possible vapor wells and the Shell 1981 remediation wells. ALL of these wells remained open. (See Figure 14)

Having reviewed the available data, NuTECH concludes that the following environmental impairments exist:

1.Gasoline contaminated soils from 5-10 feet BGS along 50th Avenue in the north and southeastern portion of the Property.

2.Gasoline and Diesel contaminated soils from 5-12 feet BGS in the southeast to west portion of the Property.

3.Used Oil Sludge contaminated soils (containing Gasoline and possible Diesel) in the southern and southwestern portion of the property between the UST fuel Tank Farm and the Used Oil Tank. In addition there is a high probability of used oil sludge impact to subsurface soils present in holes in the asphalt behind the bays at the southwestern portion of the Property.

4.A perched or semiperched groundwater zone present at ~ 19-21 feet beneath the site has been contaminated with the noted contaminants possibly as the groundwater rises under pressure in the noted wells and conduits.

5.Finally, because of poor housekeeping as observed when NuTECH arrived on-site in 1997, there may be the possibility of surface contamination of some wells in the areas near the maintenance bays.

We have displayed these possible impediments on Figure 14 for ease of review of our proposed remediation plan.

4.1 Objectives

Having concluded the present state of the site is as discussed above, the objectives of this Corrective Action Workplan are to complete the following:

- ☐ Elimination of the hydrocarbon contamination "source" or the (4) on-site UST's and associated piping and dispensers.
- ☐ Eliminate possible surface conduits for further contamination of the shallow groundwater zone by proper abandonment of existing bores, wells and collection sumps installed by previous property owners.
- ☐ Excavate and remove fuel laden subsurface soils, which may provide the contamination source for shallow groundwater zone resources. It is estimated that 1 to 2 feet of fuel contaminated soils from beneath the groundwater table in the area of the UST's and eastern piping lines will be removed.
- ☐ Aggressively de-water soils in the UST excavation area, removing solubilized and free floating fuel constituents.
- ☐ Replace UST excavation and piping trench run soils with imported clean, self compacting materials, in anticipation of installation of new double-walled tanks, product lines and dispensers. The trenches and excavation will be deeper and wider to ensure proper compaction and placement into clean materials of the new monitored equipment.
- ☐ Once excavation and new construction activities are completed, install and construct groundwater monitoring wells to monitor post-remediation groundwater conditions and clarify if passive in-situ remediation is underway consistent with California Water Quality Control Guidelines for proper site closure.
- ☐ Gather sufficient information from the soils and groundwater to allow evaluation of the risk presented by the contamination, and to support a program of on-going monitoring of the groundwater to verify passive remediation of the dissolved phase gasoline constituents.

NuTECH will undertake all activities necessary to remove the environmental hazards from the site and obtain site closure. As part of this responsibility, NuTECH will obtain all permits and licenses needed to perform the work as well as incorporate all appropriate safety equipment and procedures to protect workers and public during completion of the Project.

4.2 Additional Characterization, Treatment Criteria & MCL's

Based on the currently available information, it is clear that there are environmental problems at the site. What is not clear is the extent and location of soils contamination since 1992. Also, it is not clear if the groundwater is indeed contaminated, or if wells are a conduit to the groundwater for shallow soils (less than 10 feet below surface) hydrocarbon contamination.

Thus prior to initiating the remediation efforts discussed in the Workplan, NuTECH will be completing the following additional investigative efforts:

- ☐ Five speed bores to ~ 20 feet below surface or first groundwater. Five foot interval discrete testing of soils for hydrocarbon type and concentration. Logs of all bores for lithological conditions. Groundwater Samples to be obtained from sample bores then bores to be grouted and closed to surface.
- ☐ One additional round of groundwater testing utilizing the same 1997 wells as a data baseline for elevation as well as chemistry. Wells A, B and NV-2 will also be fingerprinted for fuel type, e.g. gasoline vs. diesel.
- ☐ Additional chemical testing of Wells A, B and NV-4 for chlorinated solvents (US EPA 601) and for ATF and Ethylene Glycols. These data are necessary to address concerns of possible surface contamination of the wells.
- ☐ Chemically profile and test contents of the UST's. Backed with lab data evacuate to residual heels for proper off-site handling prior to scheduled removal of the UST's.
- ☐ Remove remaining (and newly discovered) debris and waste containers, e.g. oil pans, drums etc.

It should be mentioned that the 1992 bore samples were tested for Total Organic Lead using the DOHS – TOL Methodology. Resultant data were all Non Detect to a MDL of 1.0 mg/Kg (ppm).

If hydrocarbon contaminated soils are obtained, then NuTECH will complete geochemical testing for permeability and porosity as well as leachability for DI and the encountered hydrocarbon type. This leachability factor will be of great assistance in the determination of acceptable hydrocarbon contamination levels suitable for abandonment on-site. Also if the groundwater is found to be protected by a self-sealing silty clay strata acting as a barrier to the groundwater, protection of this aquitard will govern excavation of hydrocarbon contaminated soils. It is anticipated that we will excavate to ~ 10 feet below surface in the area of the gasoline contaminated soils along 50th Avenue (or just below the piping run). Based on 1992 soils bore data (Table One this submittal) soils from 12-15 feet below surface were non detect for hydrocarbon.

In general, three areas of contaminated soils have been documented:

- ☐ Gasoline contaminated soils in the northwestern area of the property along 50th Avenue.
- ☐ Gasoline and Diesel contaminated soils in the southeastern area of the property near the UST farm area.
- ☐ Waste Oil and other fuels in the southwestern area of the property near the waste oil tank and behind the bays of the service building.

The Maximum Cleanup Level we would propose for groundwater beneath the site would be governed by this additional round of testing. The Leachability Test Data and refinement of the subsurface soil characterization would also aid in establishing field criteria to ensure compliance with the proposed groundwater cleanup level.

Based on prior experience with similar sites in the Los Angeles region, NuTECH proposes to remediate the groundwater resources beneath the site to the following level:

TABLE NINE
PROPOSED MAXIMUM CLEANUP LEVEL GROUNDWATER – HIGHLAND PARK

BENZENE	200 ug/L (ppb)

While TPH, Toluene, Xylenes and MTBE pose some risk at current readings, Benzene is the only listed IRAC carcinogen constituent. In addition we conclude this recommended MCL is warranted because:

- ☐ There appear to be no significant groundwater resources beneath the site. The water-bearing unit at ~ 20 feet BGS appears to be a perched or semiperched zone which has no communication with significant Basin resources;
- ☐ These local shallow groundwater zones are not likely to have an impact on surface waters because of the apparent lack of hydraulic connection with the surface; and
- ☐ The groundwater in the area beneath the site is designated as beneficial use for several purposes but constitutes a very small resource with little practical utilization potential.

The potential for environmental exposures to any remaining petroleum contamination at the site will be reduced or eliminated by the removal of the contaminated soils and the replacement of the paved surface following the proposed renovation of the facility. Once we have removed the "source" of the shallow groundwater contamination, we propose to complete at least three Quarters of groundwater monitoring from to-be-installed groundwater monitoring wells. Hopefully the data will demonstrate passive remediation and natural attenuation of the residual solubilized constituents and permit LARWQCB to grant Site Closure --- No Further Action designation for this site.

4.3 Well Closures, UST Removal and HC Contaminated Soils Excavation/Removal

After completing the additional investigation as discussed in 4.2 of this CAP, and reviewing resultant data with LARWQCB, we will initiate the UST removal efforts. Prior to scheduling the tank removals however, we will close and properly abandon all existing wells and conduits from the surface. These conduits include:

- ☐ Wells A-F
- ☐ Wells NV 1-4
- ☐ Shell Oil's 6 inch and 12 inch diameter recovery wells.

It should be mentioned that any "free floating" petroleum contamination, e.g. the fluid contents of the waste oil-contaminated well (Number A), will be evacuated prior to destruction of the well and will be properly disposed of at an off-site TSDF.

While we could theoretically utilize these wells for post source removal monitoring, the absence of reliable installation and construction schematics has led us to recommend abandonment of all remaining on-site wells and construction of new ones following excavation and source removal efforts.

NuTECH has completed a Workplan and Submittal Package for UST removal permits from the Los Angeles City Fire Department and Los Angeles County Public Works and will submit them after approval from LARWQCB as Lead Agency of this CAP. After obtaining permits from LAFD and LAPWD, the following underground storage tanks will be removed from the property:

- Two 8,000 gallon gasoline tanks
- One 5,000 gallon gasoline tank
- One 5,000 gallon diesel tank
- One unknown volume waste oil tank

In addition, all single-walled product piping will be removed and replaced with new double-walled pipe, and the dispensers will be replaced with compliant systems and hoses. This will ensure compliance with 1998 regulatory requirements and help to avoid future spills.

The UST's will be triple-rinsed, dried and degassed prior to their removal from site. Manifests and other documentation of the proper transportation and disposal of the UST's will be provided to both LAFD and LAPWD consistent with UST removal requirements. In addition we will include these documents in our *Report of Interim Remediation* to the LARWQCB.

The three areas of petroleum contaminated soil have been somewhat defined by previous investigations and will be further defined consistent with the activities discussed in Section 4.2. An anticipated excavation plan will be presented to LARWQCB with resultant data of the additional assessment activities. The soil in these areas will be excavated during the tank removal activities and will be lab tested and classified for off-site recycling at an approved facility (probably CDE Resources at Devore). The sides and bottom of the excavated areas will be monitored by portable instruments for the presence of volatile organic compounds and samples will be taken for laboratory analysis. Any contaminated groundwater encountered during the tank removal and soil excavation work will be drummed, profiled and taken off-site for disposal/recycle.

NuTECH anticipates the excavation and disposal of approximately 200-250 cubic yards of petroleum contaminated soil, primarily from the areas of the UST's, the used oil tank, and the piping to the 50th Avenue dispenser island. The excavated areas will be backfilled with imported clean soil and/or self compacting pea gravel depending on location. All disturbed concrete pavement will be replaced. The existing drums of soil and groundwater will also be disposed of, with copies of all manifests to be submitted to LARQCB in the *Report of Interim Remediation.*

Soils will be tested during excavation for tank removal. All soils which show unacceptable levels of TPH as gasoline or diesel will be removed from the site for recycle treatment. Proper disposal of demolition debris (concrete, asphalt, etc.) will be documented by copies of all necessary permits and manifests.

4.4 Monitoring Well Installation & Site Closure Strategy

Because of the notable absence of reliable construction and installation schematics for existing groundwater monitoring wells, NuTECH will install new groundwater monitoring wells. At this time it is anticipated the five wells will be installed as shown on Figure 15. One well will be located upgradient along York Boulevard in the area of existing Well F, the other wells will be located downgradient near the 50th Avenue Dispenser Island and at the Southern Property Perimeter. At present, it is anticipated that the new owner will utilize the same footprint for the to-be-installed UST's and product piping to Dispensers.

Monitoring well construction and installation permits will be obtained from LACPWD prior to arriving on-site. All wells will be constructed in accordance with Title 23 California Code of Regulations (CCR), Division 3, Chapter 16, Article 4, Section 2647 (Groundwater Monitoring) and Section 2648 (General Construction and Sampling Methods). In addition, the designated driller - Tri County Drilling of San Diego has a current C-57 #547737 license, as required by state law.

Five 2-inch diameter monitoring wells will be installed. Anticipated locations are again shown on Figure 15. It is our understanding that groundwater, if present, will be encountered at a depth of approximately 19-21 feet below existing grade. Each well will be screened over a single vertical interval. Generally, the wells will be screened over a span of at least 15 feet or 5 feet above the water table and 10 feet below. The monitoring wells will consist of solid casing from existing grade to 12-15 feet below grade and 20 slot (or 0.02 inch slotted) PVC casing from 12-15 feet below grade to 30 feet below grade. The annulus of the well will be backfilled with the following materials simultaneous with the removal of the auger:

- Lonestar #3 Monterey Sand from the bottom of the boring to approximately 2 feet above the screened interval;
- Approximately three feet of Enviroplug^{tm} Bentonite Pellets will be placed on top of the sand; and
- A mixture of Portland Cement with 6% powdered Bentonite from the top of the Bentonite to the surface.

The well head will be completed at grade with a traffic rated well box. A locking well cap with rubber seal will also be installed. Thus, the wells will be guarded from casing damage and secure from unauthorized entry. A typical well construction diagram is included as Figure 16.

Following installation, each well will be checked for the presence of free floating liquid hydrocarbons prior to purging. If liquid hydrocarbons are encountered, an oil-water interface probe will be used to measure the thickness of the layer, as well as to measure the depth to groundwater. Groundwater will not be purged, nor will water samples be obtained from wells containing this free floating hydrocarbon product. Product samples may be obtained to determine the fingerprint and constituents of the product.

If no hydrocarbon free floating phase is encountered, then each monitoring well will be developed utilizing airlifting, surging or bailing and pumping. The wells will be developed until the majority of the sediments are removed from the water, or until four hours of development have been completed. If the well can yield appreciable amounts of water, the pumping may be incorporated in the initial development. Electrical conductivity, turbidity, pH and temperature measurements will be recorded in the field during development.

After a minimum of one week from development, the wells will be sampled. Each well will be purged using either a PVC hand bailer or a bailing pump. Prior to purging the static water level will be measured using a Solinst^{tm} Water Sounding Meter. A minimum of three well volumes will be removed, or the well will be purged dry, whichever comes first. Temperature, turbidity, pH and electrical conductivity measurements will be recorded during purging and sampling activities. All purged water will be containerized in a 55 gallon DOT certified drum, which will be labeled as to contents and date of collection. A certified-sterilized and individually seal packed PVC/Teflon hand bailer with bottom emptying device will be used to collect the groundwater sample. The groundwater sample will be collected after the water level has recovered to a minimum of 80% of the static water level.

Each monitoring well will be surveyed by a California Licensed Surveyor to obtain a relative elevation for development of groundwater flow direction and gradient map. When surveying the wells, the elevation (with respect to Mean Sea Level or an arbitrary datum) will be measured at a point, marked and notched on each of the wells' PVC rising casing. This point will be used as the point from which to obtain depth to groundwater measurements. The elevation of the closed vault box lid will also be recorded. Elevations will be surveyed to within 0.01 feet.

Selected soil samples from each boring will be analyzed by US EPA Test Methods 8015, modified for Total Petroleum Hydrocarbons as Gasoline and Diesel, and by US EPA Method 8020 for fuel aromatics Benzene, Toluene, total Xylenes, Ethylbenzene, and MTBE. The detection limits for US EPA Method 8015 are 10 mg/Kg in soils and for US EPA 8020 are 0.005 mg/Kg for BTX&E and MTBE. Selected samples will also be analyzed to organic lead by US EPA 7420 (TTLC).

Groundwater Samples will be analyzed by US EPA Test Methods 8015 and 602. The detection limits for 8015 TPH are 50 ug/L; and for 602 are 0.5 ug/L for Benzene, Toluene, Ethylbenzene and total Xylenes and 5.0 ug/L for MTBE. Chain of Custody Forms and QA/QC documents will be included in the Report of Installation to LARWQCB. NuTECH will perform quarterly groundwater sampling and analysis at each monitoring well and will provide the results of each monitoring effort to the LARWQCB.

It is anticipated that some petroleum affected groundwater will be encountered during the tank removal operations. All contaminated groundwater removed during construction related de-watering operations will be treated or removed for offsite disposal/recycle.

At the end of the three Quarters of groundwater monitoring, armed with supportive data documenting passive remediation of any residual hydrocarbons, NuTECH will request the granting of a site closure by the LARWQCB. After the site is officially closed, all existing groundwater monitoring wells on site will be destroyed consistent with closure and abandonment rules of the CWRCB.

4.5 Project Safety Plan

This document presents the health and safety procedures that are intended to guide field activities for the Well Closures, UST Removals, HC contaminated soils excavation, and additional groundwater investigation efforts presented in this CORRECTIVE ACTION WORKPLAN for the former P&M Gas Station, 4954 York Boulevard, Highland Park, California (Los Angeles County). This Health and Safety Plan (HSAP) is intended to augment the formal Illness and Injury Prevention Program, an in-house document applicable to all NuTECH employees, which NuTECH Enterprises formulated in 1993 in compliance with SB198. The provisions of this HSAP, compiled in accordance with the requirements of OSHA Standard 1910.120, Title 29, CFR, are intended to apply uniformly to employees of NuTECH, other identified persons (e.g.. Nieto and Tri County employees), as well as ALL subcontractors, vendors and visitors to the site. Federal, State and local agencies are expected to observe the safety rules and regulations established by their respective organizations in addition to the requirements of this document.

The person responsible for project safety and enforcement of the provisions of this plan is the Site Manager. He has the authority to audit compliance with the provisions of this plan, suspend work or modify work practices for safety reasons, and to dismiss individuals whose conduct on-site endangers the health and/or safety of others.

The Site Manager is responsible for distributing the safety plan to all field personnel and to an authorized representative of each firm contracted to assist with on-site work. The Site Manager is also responsible for implementing and enforcing the provisions of this plan and its addenda.

On-site implementation of this plan includes: 1) maintaining safety equipment supplies, 2) performing various kinds of quality monitoring and measurements as required or needed, 3) directing decontamination operations and emergency response operations, 4) setting up work zone markers and signs if such zones are required, and 5) reporting all accidents, incidents, and infractions of safety rules and requirements.

4.5.1 Work Description

As detailed in this CORRECTIVE ACTION WORKPLAN, the proposed work includes excavating ~ 100 tons of gasoline contaminated soils, drilling three exploratory bores to ~ 30 feet BGS, obtaining discrete samples, drumming drill spoils, and converting the bores to groundwater monitoring wells for Quarterly Monitoring. The samples will be transported to Labs as noted for testing, and the spoils will be profiled and shipped to an appropriate Recycle Center. At the conclusion of operations the bore area will be swept and finished with concrete for full site restoration.

All work will be performed during daylight hours to promote worker safety and preclude the need for auxiliary lighting.

Surveillance of workers and the general project supervision for compliance with and enforcement of the HSAP will be assigned to the Site Manager, an appropriately trained NuTECH professional. The Site Manager will be on-site during all project activities and will have the duty and the authority to remove any persons from the project site who are not conforming to dictates of the HSAP.

4.5.2 Hazard Assessment

Potential hazards have been identified as potentially associated with the investigative activities proposed for this site.

A *Biological Hazards*

Other than gasoline contaminated soils which will be discussed in the chemical hazard section, there appear to be no biological hazards directly associated with the activities proposed for this site. In addition, there are no known or suspected on-site sources for ionizing radiation. A review of historical land uses for the site confirms the absence of potential on-site sources for ionizing radiation.

B *Physical Hazards*

The potential physical risks are those which are normally associated with working around excavating, drilling and sampling equipment and tools. There are no overhead utility lines in the planned operation areas and qualified utility locators will be utilized prior to commencing excavation activities to clearly delineate any/all underground utilities.

C *Chemical Hazards*

The major compounds likely to be encountered are alkenes and alkanes in the C_{10}-C_{23} series characteristic of gasoline and petroleum fuel products. The highest degree of risk is that associated with lighter hydrocarbon products which may be encountered and/or de minimus amounts of Proposition 65 components (aliphatic and aromatic) of these products (BTX&E). Thus these components have been segregated as of concern for this safety plan. The following is a brief description of the potential hazards associated with these components:

TABLE TEN
Fuel Components of Health Concern

Material	CAS No.	Recommended Exposure Limits Type	Amount	Agency
Benzene	71-43-2	8-hr TWA	10 ppm	ACGIH
		STEL	25 ppm	ACGIH
Toluene	108-88-3	8-hr TWA	100 ppm	ACGIH
		STEL	150 ppm	ACGIH
Xylene	1330-20-7	8-hr TWA	100 ppm	ACGIH
		STEL	150 ppm	ACGIH
Ethyl Benzene	100-41-4	8-hr TWA	100 ppm	ACGIH
		STEL	150 ppm	ACGIH

These materials are common constituents of fuels and are present in some detectable amounts in the other suspected oil/asphaltic products. They are colorless liquids with strong aromatic petroleum hydrocarbon-like odors. They are all flammable, are moderately volatile, their vapors are heavier than air and they have low solubility in water.

Contact with these materials in excess of their recommended exposure limits can cause mild eye, nose and throat irritation and can produce a narcotic effect on the central nervous system. Systems of exposure at these concentrations include headache, nausea, drowsiness, dizziness and loss of coordination.

Prolonged exposure at these concentrations can result in unconsciousness and coma. Although not toxic by skin absorption, these materials are absorbed through the skin, and skin exposure may contribute to other routes of exposure. They all defat the skin. There is some evidence to indicate that repeated and prolonged exposure may result in a condition known as "solvent syndrome" characterized by reversible central nervous system damage. There is also some evidence to indicate that toluene may sensitize the heart, predisposing exposure victims to cardiac arythmias. Fuels containing benzene, toluene and xylene may be toxic and have been shown to cause leukemia, blood disorders and chromosome damage in humans and adverse birth effects in laboratory animals. They are also on the California Proposition 65 list. A typical MSDS for Chevron Gasoline is included as Appendix F.

A 25-foot No-Smoking zone will be maintained during working hours and the mitigation equipment area posted.

C.1 Inhalation Hazard

The vapor concentrations that might be encountered during excavation or mitigation may exceed currently recommended exposure limits. Respiratory protection must be used if 80 percent of the exposure limits are exceeded.

C.2 Dermal Exposure Hazard

Contact of sufficient duration to cause significant absorption of toxic components is highly unlikely. Repeated daily or prolonged contact with excavation spoils or recaptured product, however, may be expected to defat the skin and perhaps over a long period of time lead to irritation and dermatitis. For this reason direct skin contact with spoils and product shall be avoided by wearing protective gloves. If contact does occur, the exposed areas shall be washed with soap and water and rinsed thoroughly.

C.3 Explosion Hazard

Elevated vapor concentrations may be present which could be sources for explosion. Caution must be taken to prevent sources of ignition such as cigarettes, open flames and non-explosion proof electrical motors from operating within the restricted zone.

4.5.3 General Health and Safety Requirements

A. Medical Clearance and Monitoring

All project personnel who may be required to wear respirators must be provide evidence that they have been tested consistent with OSHA 29 requirements.

B. Safety Orientation Meeting

All field personnel will attend a safety orientation meeting before commencing the field work. The meeting will be scheduled and conducted by the Site Manager and must include respirator-fit testing for all individuals who have not been test-fitted and who may be required to wear respirators. The meeting will include presentation of the Health and Safety Plan.

C. Work Zone

A restricted zone will be maintained to a distance of 25 feet from the work area. The work zone is to be marked with barricade and tape. Protective clothing and equipment, as described below, are to be worn by all personnel working within the restricted zone.

D. Protective Equipment and Clothing

(1) Equipment Required For Field Personnel
  - Hard hat
  - Boots with Toe Protectors

(2) Equipment Required to be Available On-Site

- Gloves (latex and/or nitrile)
- Two respirators (half-mask with organic vapor cartridges)
- First-Aid kit with eye wash
- Fire extinguisher
- Construction tape and barriers to delineate work zone
- No Smoking signs
- A vehicle with keys in the ignition must be kept on-site when personnel are working, for the transport of slightly injured personnel to the hospital. **Severely injured personnel MUST ONLY be transported by Paramedics**

(3) Respirator Usage

The Site Manager is responsible for deciding if respirator use should be routine or based on OVA measurements. If the decision is made to work while wearing a respirator, cartridges for the respirators must be replaced daily or when break-through occurs, which ever occurs first.

(4) Buddy System

All field personnel are to work with another person at the site. The subcontractor's representative can serve as the second person while work is being conducted in the field. Under no circumstances, other than completion of paper work at the end of the day, are field personnel to work alone at the site while conducting field activities.

4.5.4. Emergency Response Procedures

A. Physical Injury - Apply first aid and call paramedics.

Severely injured personnel are to be transported only by paramedics and/or ambulance personnel. At the hospital, a physician's attention is mandatory regardless of how serious the injury appears.

A written report is also to be prepared by the Site Manager (Appendix F).

B. Fire, Explosion and Property Damage

In the event of a fire or explosion, notify the fire department immediately by DIALING 911 as well as the La Paz Car Wash Manager who will be present on-site during the excavation and loading activities.

EMERGENCY TELEPHONE NUMBERS

Fire.............911
Police...........911
Paramedics.......911

WORK SITE ADDRESS

4954 York Street, Highland Park, CA

CONTACT: Site Manager
Bill Lavelle

HOSPITAL ADDRESS (See Figure 17- for Route from Site)

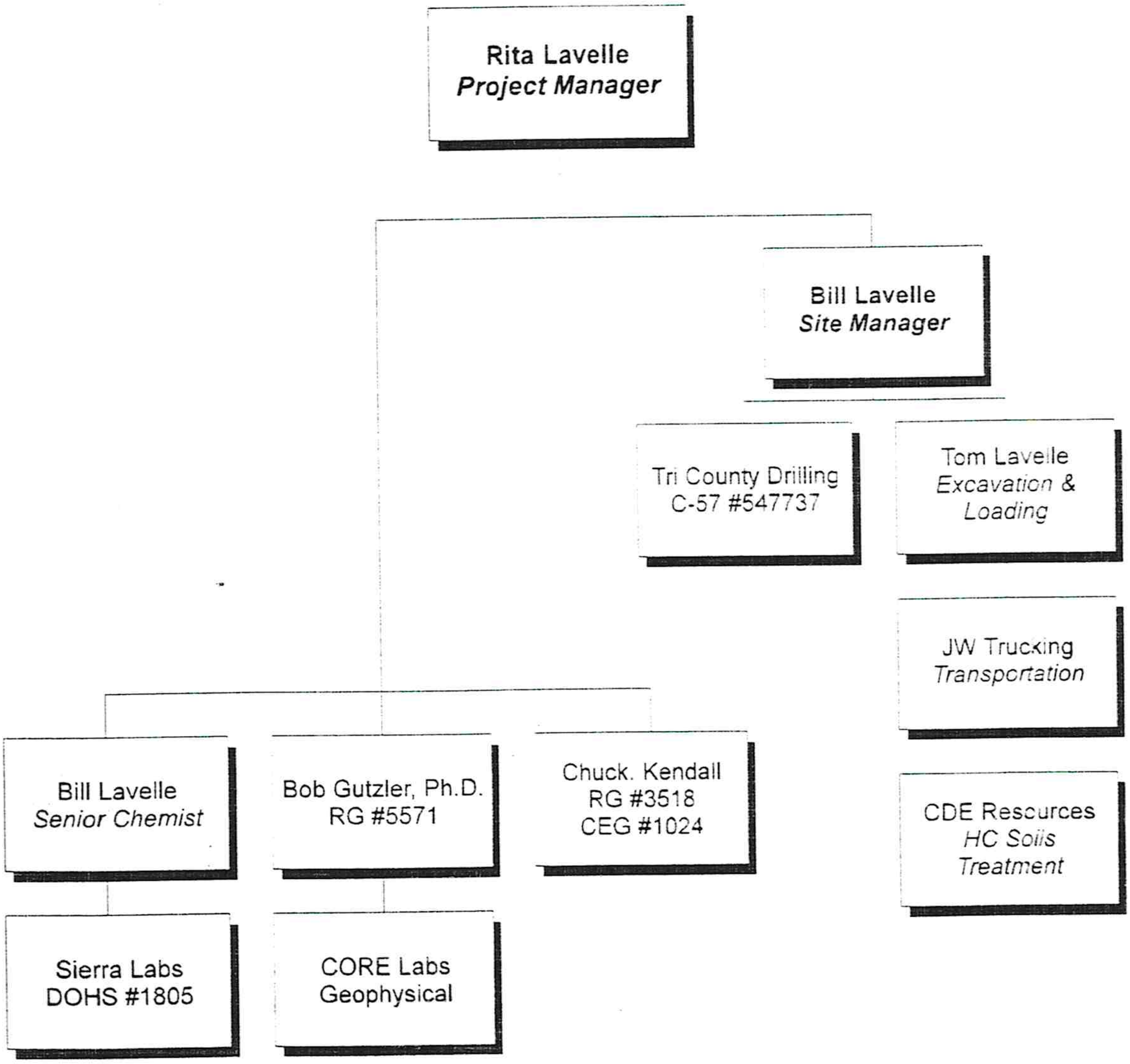
Glendale Adventist Hospital
1509 Wilson Terrace
Glendale, CA 91206
(818) 409-8000

Take York West to eagle Rock Boulevard; Left to Verdugo Road; Right on Verdugo Road (North); Right on Chevy Chase Drive; Hospital will be on Right Side.

VI. PROJECT TEAM & SCHEDULE

NuTECH dedicates only fully experienced and trained personnel to completion of their Projects. For this Corrective Action Workplan we envision assigning the following Project Team:

TABLE ELEVEN
PROJECT TEAM



Sierra Labs is a fully certified DOHS/ELAP (#1805) Laboratory. Tri City Drilling is a licensed C-57 Drilling Contractor. The equipment operator, Project Geologist and Hydrogeologist as well as the Project Manager and Site Supervisor are all experienced and have completed several similar Projects within the last few years.

A detailed Project Schedule is displayed below for review. The first action will be the five bore "refinement" of existing soils and groundwater data as discussed in Section 4.2 and the additional testing of existing groundwater monitoring wells A-F with a properly completed round of groundwater testing prior to initiation of UST removals and soils excavation.

Three reports will be generated and submitted to LARWQCB as Lead Agency:

- ☐ A Report of Additional Investigation and Characterization
- ☐ Report of Interim Remediation (UST Removals and Contaminated Soils Excavation/Removal)
- ☐ Report of Groundwater Monitoring Well Installation and Construction

After these reports are complete it is envisioned that there will be at least three Quarters of Report of Groundwater Monitoring submitted to LARWQCB consistent with requirements for approved CAP's. The additional efforts will continue as scheduled until proposed and LARWQCB approved MCL's are reached and passive remediation of groundwater is scientifically exhibited with supportive Lab Data. At that point a formal request for Site Closure -- no Further Action will be submitted to LARWQCB. Once Site Closure is awarded, the groundwater monitoring wells will be properly closed and abandoned consistent with permits from LACPWD and CWRCB policies.

TABLE TWELVE
PROJECT SCHEDULE

Task	Feb				Mar				Apr				May/Jun			
Submit Corrective Action			■													
Additional Investigation & Report of Additional Investigation						■										
Permits for UST Removals & Well Closure					■		■									
Excavate HC Contaminated Soil							■									
Verify Excavation							■									
Close Excavation								■								
Soils Off-Site									■							
Install GW Wells										■		■				
GW Tests															■	
Submit Closure Report; Close Wells and Abandon Site																■

VI. REFERENCES

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VII. SUBMITTAL STATEMENT

NuTECH's proposed Corrective Action Workplan for Soils and Groundwater Remediation as presented has been completed with the degree of care and skill ordinarily exercised under similar circumstances by reputable Engineers, Geologists, Chemists, as well as other Scientific Professionals practicing in this or similar localities. No other warranty, expressed or implied, is made regarding the conclusions and professional advice included in this Report.

The findings of this Report are valid as of the present date. Due to natural processes or works of man on this or adjacent properties, however, changes in the condition of a property can occur.

The interpretations and conclusions of this Report are based in part on data supplied by others (City, County, State and Federal agencies as well as cited private Consultants). Such information is presumed correct and representative. We disclaim any responsibility for any inaccuracy of information supplied by others in the preparation of this Report.

Changes in applicable or appropriate standards may also occur as a result of legislation or broadening of knowledge. As a consequence, the findings of this Report may be partially or entirely invalidated by changes outside NuTECH's control.

The opportunity to be of service is sincerely appreciated. If you have any questions, please call NuTECH at (760) 631-0631.

Sincerely,

Rita M. Lavelle

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